Haldex
Barnes Hydraulics

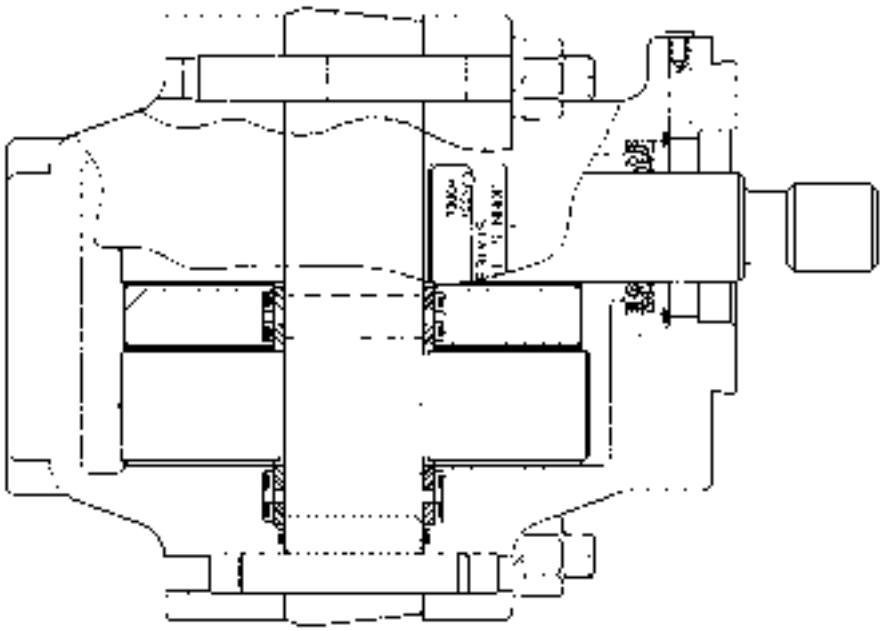
G20 & G30 Series
Hydraulic Gear Pumps

Inspection / Servicing

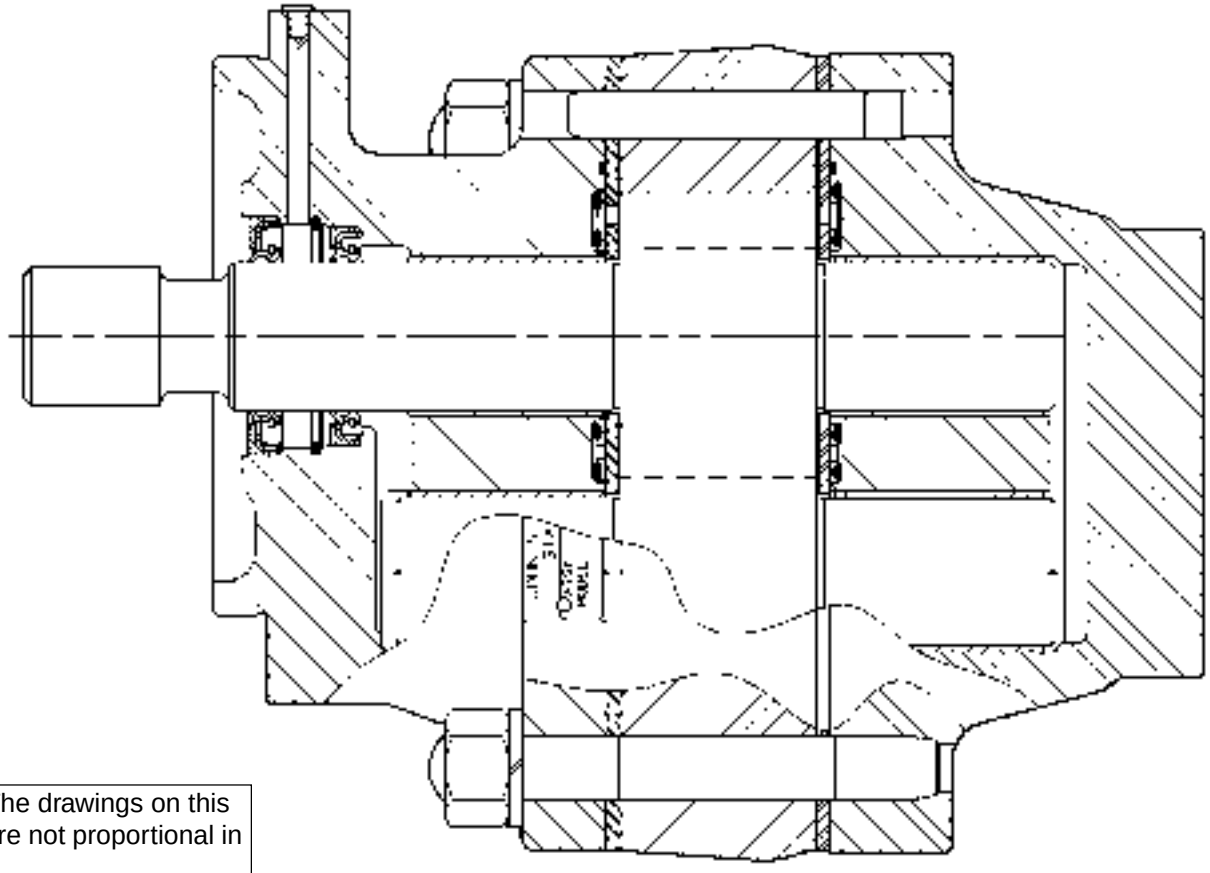
Service Manual

No. SD - 97105
August 1997

G20 Series Cross Sectional Drawing

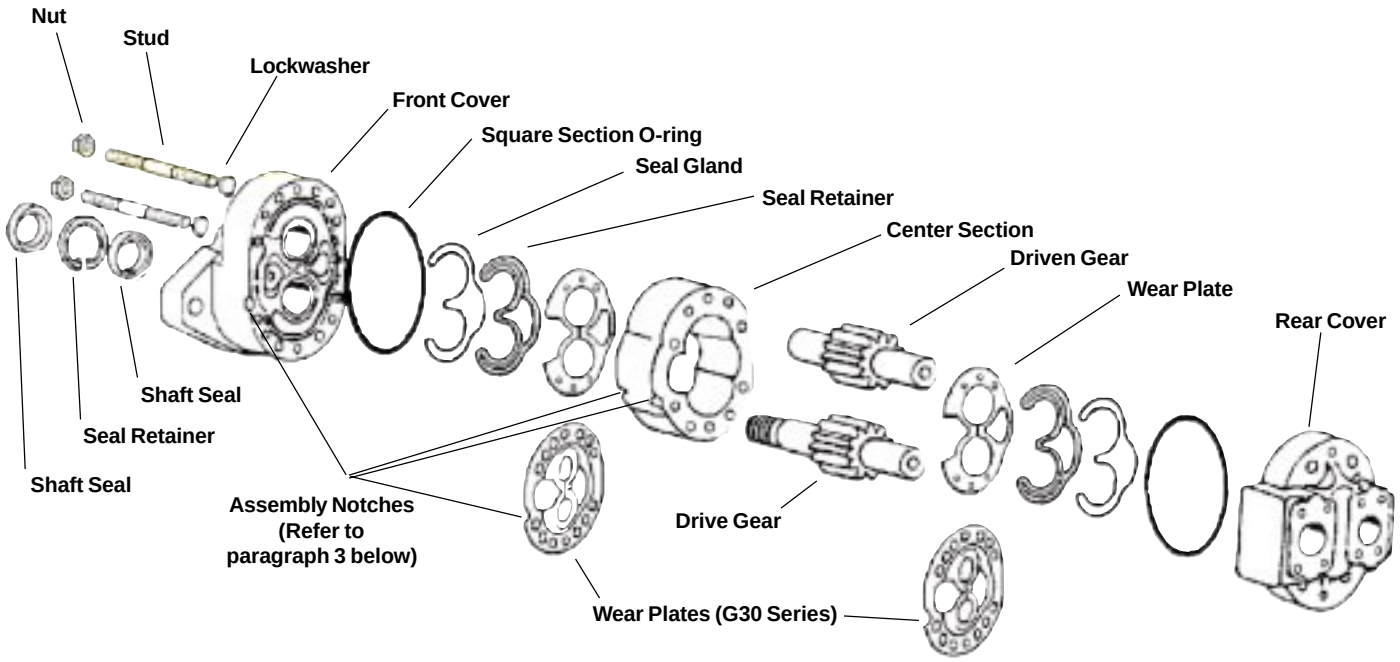


G30 Series Cross Sectional Drawing



Note: The drawings on this page are not proportional in size.

G20 Series Exploded View Drawing



Tools Required

- Socket Set (1/2" drive)
- Internal Snap Ring Pliers
- Shaft Seal Sleeve or clear tape
- Torque Wrench - 200 lb-ft capacity
- Plastic hammer
- Torque wrench box end adapters (Sturtevant Co. P/N BX-11/16 & BX-7/8)

Disassembly

Note: The following general instructions apply to both the G20 and G30 Series gear pumps, the G20 Series is shown in the photographs. The following instructions also apply to double gear pumps.

1. It is very important to work in a clean work area when repairing hydraulic products. Plug ports and wash exterior of pump with a proper cleaning solvent before continuing.

2. Remove port plugs and drain oil from pump.

3. It is not necessary to mark the outside of pump before disassembly as the front cover, center section and rear cover all have notches cast into the edges of these parts. By lining up the notches of these three parts the pump will be properly assembled and proper rotation of the pump will be assured. *(Refer to exploded view drawing above)*.

4. Remove key from drive shaft if applicable.

5. Clamp pump across protected ports in large vise or holding fixture with shaft end up.

6. Loosen and remove the eight nuts and lockwashers from the stud bolts.

7. Remove pump from vise and place on clean work bench. Use a plastic mallet to separate the front cover from the rest of the pump. The two dowel pins which align the front cover, center section and rear cover are a tight fit and will require the use of the plastic mallet to separate these parts. *(Do not use a screwdriver or other pry tool to separate these parts as damage will result)*.

8. Remove front cover. Identify intersecting teeth of drive and driven gears with a marking fluid before removing from pump. Carefully remove drive gear from pump and place on work bench.

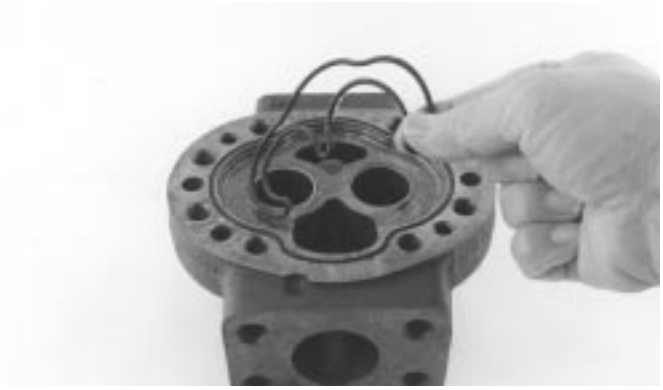
11. Remove the eight studs from rear cover.

9. Remove driven gear from pump and place on clean work bench.

12. Remove wear plate from rear cover.

10. Remove center section from pump .

13. Remove seal retainer from rear cover and discard as it will be replaced as a new part.



14. Remove the seal gland from rear cover and discard as it will be replaced as a new part.

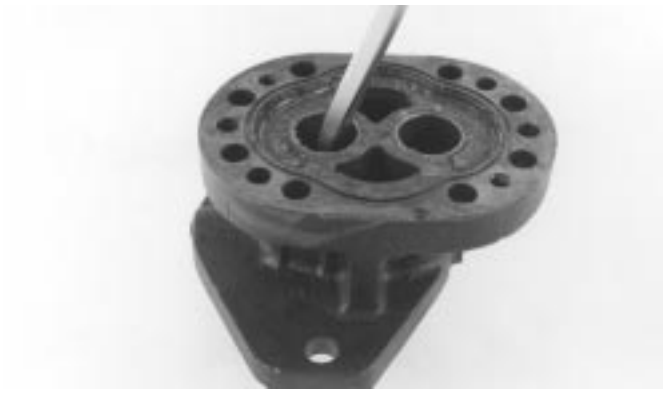
15. Remove square cross section o-ring from rear cover and discard as it will be replaced as a new part.

16. Remove wear plate from front cover. Remove rubber plug from seal weep hole.

17. Remove seal retainer from front cover and discard as it will be replaced as a new part.

18. Remove seal gland from front cover and discard as it will be replaced as a new part.

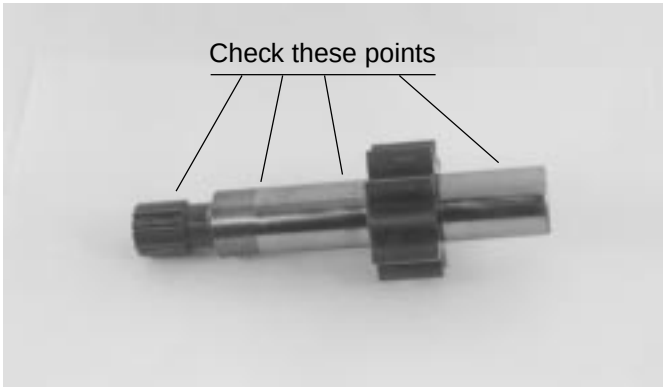
19. Remove square cross section o-ring from front cover and discard as it will be replaced as a new part.



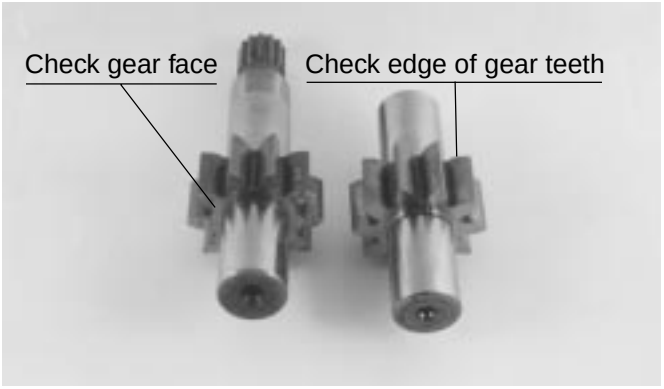
20. Remove seal retainer if applicable from front cover and use a screwdriver or seal removal tool to remove the shaft seal from front cover.

Inspect Parts For Wear

1. Clean and dry all parts thoroughly prior to inspection. It is not necessary to inspect the seals as they will be replaced as new items.



2. Check drive gear spline for twisted or broken teeth, nicks or excessive wear. Inspect gear journals for scratches and discoloration. Any discoloration of shaft requires replacement of drive gear. Inspect gear teeth for spalding, scratches or excessive wear. Replace if necessary. Light stoning of teeth to remove sharp edges is permissable.



4. Inspect gear face of both the drive gear and driven gear for scoring or excessive wear. If the face edge of gear teeth are sharp, they will mill into the wear plates. If wear on the face of the gears has occurred, the gears must be replaced.

5. Inspect bearings in front cover for excessive wear, scoring, flaking or movement of bearings.

6. Inspect bearings in rear cover for excessive wear, scoring, flaking or movement of bearings.

7. Inspect the gear pockets inside the center section. It is normal for the surface inside the gear housing to show a clean “wipe” on the inside gear pocket wall on the intake side. There should not be excessive wear or deep scratches and gauges.

8. Inspect bronze side of both wear plates for erosion, pitting, scratches or scoring, replace if damaged.

General Information

It is important that the relationship of the front cover, center section and rear cover is correct. Notches cast into the outside surface of these three parts must be aligned for proper reassembly of this pump. Failure to properly assemble this pump will result in low flow, low pressure and possible damage to the pump.

Note: Upon reassembly of pump, all parts should be lightly oiled with clean hydraulic fluid or approved assembly fluid. Use small amounts of graphite grease to hold seal retainer and seal in place during assembly.

Shaft Rotation of Pump *(Note: This pump is not bi-rotational and the shaft rotation cannot be reversed).*

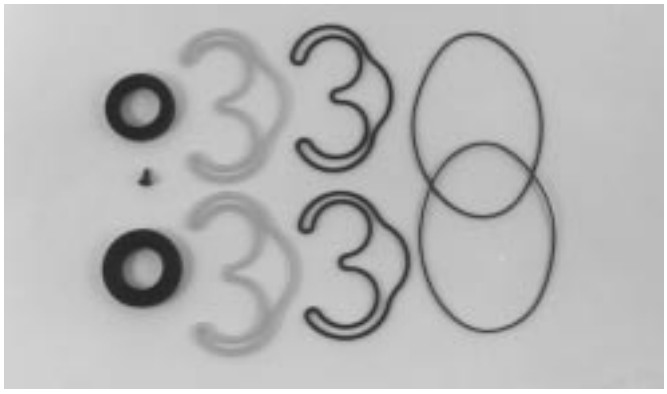
Reassembly

(Note: New seal glands, seal retainers, square cross section o-rings, shaft seals should be installed upon reassembly of pump and are included in the seal kits available for these pumps).

Seal Kit Part Numbers:

866855 - Standard Seal Kit for G20 Series Gear Pump.

920097 - Standard Seal Kit for G30 Series Gear Pump.



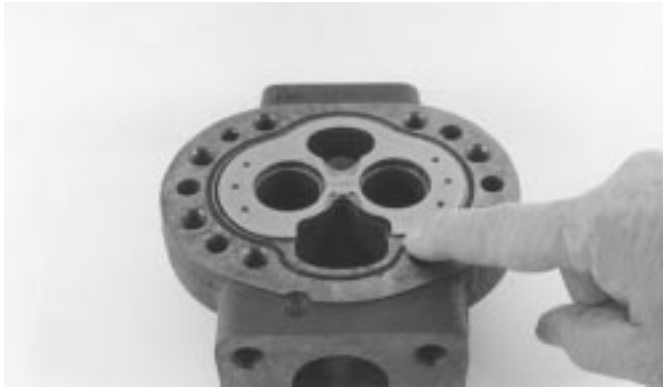
Contents of typical G20 Series Seal Repair Kit.

1. Install new shaft seal in front cover, make sure the spring loaded member of shaft seal faces the inside of pump. Press the seal into the seal bore until the seal reaches the bottom of the bore. Uniform pressure must be used to prevent misalignment or damage to the seal. Retain with retaining ring if applicable. Coat seal land with graphite grease after installation.

Double Shaft Seal arrangement - Install first shaft seal and retaining ring as instructed in the paragraph above. Next install a new outer shaft seal which has a larger O.D. in seal cavity. Make sure the spring loaded member of shaft seal faces the inside of pump. Uniform pressure must be used to prevent misalignment or damage to the seal. Press until seal is seated properly.

2. Place rear cover on clean work bench with seal cavity area facing up. Coat seal cavity with graphite grease to hold seals in place.

3. Coat both the seal gland and plastic seal retainer with graphite grease. Carefully install the seal gland in the groove in the seal retainer, make sure the seal gland is seated completely in the seal retainer.



6. Apply a light coating of graphite grease to the square cross section o-ring and carefully install in groove in rear cover. Be very careful that the o-ring does not twist in the groove, it must be flat in the groove or the pump will leak at this seam.

4. Install the assembled seal gland and seal retainer in the cavity in the rear cover. Very carefully press this assembly in place until it is firmly seated in the machined recess. This is important for proper installation of the bronze wear plate.

7. Install the eight studs in the rear cover. The course thread end of the studs thread into the rear cover. Torque studs to 300-420 lb-in / 25-35 lb-ft / or 33.9 - 47.5 Nm.

5. Lubricate the bronze face of the wear plate and install over the seal retainer. When properly placed the bronze face will be next to the gears and flush with the surface of the rear cover. This photo shows the G20 wear plate, the G30 wear plate covers the full surface of the cover plates.

8. Install center section over studs, make very sure the notches are in alignment with the notch in the rear cover. It may be necessary to use a plastic mallet to seat the center section due to the tight fit of the dowel pins.Hold the wearplate in position while tapping center section.

9. Lubricate the drive gear and driven gear and install the gears in the proper bearings in the rear cover. Align marked gear teeth at this time.

10. Place front cover on clean work bench with seal cavity area facing up. Coat seal cavity with graphite grease to hold seals in place.

11. Coat both the seal gland and plastic seal retainer with graphite grease. Carefully install the seal gland in the groove in the seal retainer, make sure the gland is seated completely in the seal retainer.

12. Install the assembled seal gland and seal retainer in the cavity in the front cover. Very carefully press this assembly in place until it is firmly seated in the machined recess. This is important for proper installation of the bronze wear plate.

13. Apply a light coating of graphite grease to the square cross section o-ring and carefully install in groove in front cover. Be very carefull that the o-ring does not twist in the groove, it must be flat in the groove or the pump will leak at this seam.

14. Lubricate the steel side of the bronze wear plate with graphite grease and install over the seal retainer. When properly positioned, the bronze face will be next to the gears and flush with the surface of the front cover.

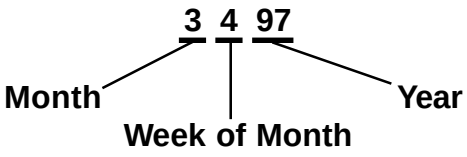
15. Place a seal sleeve *(sleeve must be used with keyed shafts)* or tape over drive shaft end and very carefully slide front cover over drive shaft and studs. Engage front cover over dowel pins. Press firmly until front cover is fully seated against center section. Make sure all notches are in alignment, if not pump is incorrectly assembled. Make sure all seals and wear plate have stayed in their proper position.

Install lock washers and nuts on studs. Torque nuts to 65-75 lb-ft / 88-101 Nm on G20 models and 145-155 lb-ft / 196-210 Nm on G30 models.

16. Place a small amount of clean oil in the inlet of the pump and rotate the drive shaft away from the inlet one revolution. No binding should be evident during this operation. The breakaway torque to turn the drive shaft must not exceed 35 lb-ft / 47.5 Nm after assembly.

17. The name plate located on the end cover contains the build date code and the model number. Please refer to this information when corresponding with the Barnes Hydraulics Service Department.

Date Code Identification:



Placing Pump Back Into Service

1. ***If shop test stand is available,*** the following procedure for testing rebuilt pumps is recommended:

A. Mount pump on test stand making sure that the proper level of clean oil is available in the reservoir. Check suction line for leaks and obstructions.

B. Start pump and run for three minutes at zero pressure.

C. Intermittently load pump to 500 P.S.I. for three minutes.

D. Intermittently load pump to 1000 P.S.I. for three minutes.

E. Intermittently load pump to 2000 P.S.I. for three minutes.

F. Remove pump from test stand and check for freeness of drive shaft. Check pump for signs of external leakage.

2. ***If shop test stand is not available,*** the following procedure for testing rebuilt pumps is recommended:

A. ***For engine driven pumps,*** mount pump on equipment and run pump at 1/2 engine speed at zero pressure for three minutes.

B. By operating control valve, build pressure intermittently for three minutes.

C. Increase engine speed to full throttle and build pressure intermittently for three minutes.

D. Stop engine and check pump for external leaks.

E. ***For electric motor driven pumps,*** run pump at little or no load for three minutes, gradually increase load on pump and cycle each succeeding load for three minutes. Check pump for external leaks after break-in test.

Single or Double Pump Trouble Shooting

PUMP TROUBLE	PROBABLE CAUSE	REMEDY
1. Pump does not develop full pressure.	a. System relief valve set too low or leaking. b. Oil viscosity too low. (oil too thin) c. Pump is worn out. d. Seal Retainer O-ring pinched.	a. Check system relief valve for proper setting. b. Change to proper viscosity oil. c. Repair or replace pump. d. Disassemble pump and check o-ring.
2. Pump will not pump oil.	a. Reservoir low or empty. b. Suction strainer clogged. c. Incorrect shaft rotation.	a. Fill reservoir to proper level. b. Clean suction strainer. c. Check for proper rotation of pump shaft.
3. Noisy pump caused by cavitation.	a. Oil too thick. b. Oil suction filter plugged. c. Suction line plugged or too small.	a. Change to proper viscosity. b. Clean filters. c. Clean line and check for proper size.
4. Oil heating.	a. Oil supply low. b. Contaminated oil. c. Setting of relief valve too high or too low. d. Oil viscosity too low.	a. Fill reservoir to proper level. b. Drain reservoir and refill with clean oil. c. Set to correct pressure. d. Drain reservoir and fill with proper viscosity.
5. Foaming oil.	a. Low oil level. b. Air leaking into suction line. c. Wrong kind of oil.	a. Fill reservoir to proper level. b. Tighten fittings, check condition of line. c. Drain reservoir, fill with non-foaming oil.
6. Shaft seal leakage.	a. Worn shaft seal or cut seal lip. b. Worn shaft in seal area. c. Wrong pump shaft rotation.	a. Replace shaft seal. b. Replace drive shaft and seal. c. Check for proper rotation of pump shaft.

NOTES

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